Remarks

The specification has been amended at pages 3 and 7 to incorporate portions of the text of originally filed Claims 53-54. No new matter has been added with the amendment.

Claims 1-5, 7-57, 73, 75-81, 83-96 and 98-121 are pending.

The amendments to the claims are merely to clarify language used in the claims and/or the subject matter claimed. The scope of the claims is intended to be the same as before the amendment. No new matter has been added.

Rejection of Claims under 35 U.S.C. § 112(1)

The Examiner rejected Claims 1-5, 7-14, 16-21, 98-100, 103-106 and 112 under Section 112(1). The Examiner maintains that the claims are not enabled for inhibiting passage of a "dopant" into a dielectric layer – but only for boron.

Support for the phrase "inhibit passage of a dopant into the dielectric layer" is in the original Claims 53-54 as filed. (Copy enclosed – *see* Appendix.)

Applicant has amended the specification of the present application at pages 3 and 7 to incorporate wording of the originally filed Claims 53-54. *See* MPEP § 608.01(l) Original Claims (emphasis added):

> In establishing a disclosure, applicant may rely not only on the description and drawing as filed *but also on the original claims* if their content justifies it...Where subject matter not shown in the drawing or described in the description *is claimed in the application as filed*, and such original claim itself constitutes a clear disclosure of this subject matter, then the claim should be treated on its merits, and requirement made to amend the drawing and description to show this subject matter. ...

The claims as presented are fully supported in the application as originally filed.

In addition, the Examiner is respectfully directed to the claims of *Applicant's related issued patents* – USP 7,247,920, USP 7,323,755 and USP 7,323,756 (*divisionals* of the present parent application). The claims of these issued patents recite a barrier layer "effective to inhibit diffusion of a *dopant* therethrough."

Accordingly, it is submitted that the claims as presented are fully enabled, and withdrawal of this rejection is proper and respectfully requested.

Rejection of Claims under 35 U.S.C. § 102(e)/103(a)

The Examiner rejected Claims 1-5, 7-14, 16-19, 98-100, 103-104, 106 and 112 under Section 102(e) as anticipated by Muralidhar (USP 6,297,095), and Claims 20-21 and 105 under Section 103(a) as obvious over Muralidhar. These rejections are respectfully traversed.

The Examiner cited Muralidhar as disclosing each of the elements of the claims, stating as follows (Office Action at page 3; emphasis added):

> Re claim 1, Muralidhar discloses a method of forming a nitride barrier layer, comprising .....exposing the silicon layer to a nitrogen-containing gas to form a silicon nitride barrier layer 106/107 (figs. 23-25; col. 16, lines 19-36) *over the dielectric*, said barrier layer *effective to inhibit passage of a dopant....into the dielectric layer*...

The Examiner is in error. Muralidhar does not teach a *silicon nitride* barrier layer *over the dielectric* – which is *effective to present passage of dopant into the dielectric layer*.

Muralidhar teaches forming isolated silicon nanoclusters **104** *with portions of the dielectric* **102** ***exposed*** – see **FIG.22** below.

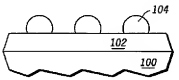

FIG.22

As stated by Muralidhar at col. 12, lines 57-67, the nanoclusters **104** are *isolated* and *spaced apart* – in order to avoid lateral charge transfer.

> ...the coverage, or area density of the nanoclusters on the underlying tunnel dielectric layer may be approximately 20%. The 20% area density is reasonable for semiconductor device manufacturing, as it provides a level of tolerance ***in the spacing between*** *the nanoclusters* included in the floating gate structures. Although higher area densities may be achieved, *the proximity of the isolated storage elements in such higher area density embodiments may increase the probability of lateral charge transfer between nanoclusters, thus degrading the beneficial effects of their* ***isolation***.

Muralidhar also teaches forming a silicon nitride encapsulation layer **106** only on the isolated silicon nanoclusters **104**.

There is *no* silicon formed on the dielectric layer **102** inbetween the silicon nanoclusters **104**. See **FIG. 23** below – noting the *arrows*.

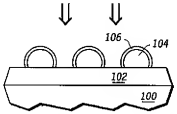

FIG.23

The nitride encapsulation layer **106** is formed on each nanocluster **104**. See at col. 16, lines 19-36 (emphasis added).

> ...**FIG. 23** illustrates the *nanocluster structures* of FIG. 22 *following an encapsulation step*. The encapsulation step forms *an encapsulation layer **106*** on each of the nanoclusters **104**. Such an encapsulation layer **106** may be formed of silicon nitride. Silicon nitride may be formed on the surface of the nanoclusters **104** by exposing the nanoclusters 104 to a nitriding ambient at high temperature...

However, there is *no silicon nitride* layer formed on the dielectric layer **102**.

Muralidhar clearly states that the dielectric layer **102** is *not* nitrided when forming the encapsulation layer **106** – at col. 16, lines 55-67 (emphasis added):

> Typically, the *nitriding ambient* used for forming the encapsulation layer **106** *does not affect the underlying tunnel dielectric layer **102*** in a significant manner. As such, the nitriding step utilized to form the encapsulation layer **106** will *not result in nitridation of the underlying tunnel dielectric layer **102***...

And as shown in **FIG. 23** – the dielectric layer **102** is EXPOSED. It is not covered by a silicon nitride layer.

There is *no* silicon formed on the dielectric layer **102** inbetween the silicon nanoclusters **104**.

There is *no silicon nitride* barrier layer formed over the dielectric layer **102** between the nanoclusters **104**.

Applicant's claims define forming a silicon nitride barrier layer over the dielectric material effective to inhibit passage of a dopant into the dielectric material.

Muralidhar does not teach forming a silicon nitride barrier layer on/over a dielectric layer – which is effective to prevent passage of dopants therethrough into the dielectric layer. There is no such silicon nitride barrier layer on or over the dielectric layer **102** of Muralidhar's structure.

Muralidhar does not teach or suggest Applicant's methods as claimed. Accordingly, withdrawal of this rejection is respectfully requested.

Extension of Term.

The proceedings herein are for a patent application and the provisions of 37 CFR § 1.136 apply. Applicant believes that a one-month extension of term is required. Please charge the required fee (large entity) to Account No. 23-2053. If an additional extension is required, please consider this a petition therefor, and charge the required fee to Account No. 23-2053.

It is submitted that the present claims are in condition for allowance, and notification to that effect is respectfully requested.

Respectfully submitted,

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Dated: March 20, 2008

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